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5/7/2019

Ref: 30B-19-0017-TNT-6763334-1

Attention: Jason Murphy

Dear Jason,

CSP Architectural FP1.4 Weatherproofing Testing

Please find the following gap analysis explaining the similarities and differences between the AS/NZS 4284 test method and the test method of FV1.1.

NCC 2019 BCA Volume 1 FV1.1	AS/NZS 4284	Significant Differences
FV1.1 Weatherproofing		
(a)		Outlines limitations and requirements that determine if FP1.4 compliance is required or satisfactory. It is of note that: FV1.1 is not a valid verification method for samples exposed to ULS pressures above 2.5kPa. AS/NZS 4284 has no such limitation.
(b) Test Specimen		
The test specimen must incorporate— **(i)** representative samples of openings and joints, including— **(A)** vertical and horizontal control joints; and **(B)** wall junctions; and **(C)** windows or doors; and	**Appendix B** The sample, with components, shall be representative both in size and shape of the facade of the building. Vertical and horizontal movement joints shall be included in the test sample. The joints shall be set on the sample within the design joint width including tolerances. The materials of the test sample	The sample requirements of FP1.4 are more specific, outlining exact features that must be included. AS/NSZ 4284 is less specific because it is written with more freedom for the designer and specifier to choose relevant sample features to subject to testing.

NCC 2019 BCA Volume 1 FV1.1	AS/NZS 4284	Significant Differences
(D) electrical boxes; and **(E)** balcony drainage and parapet flashings; and **(F)** footer and header termination systems; and	(glass, aluminium, stone, reinforced concrete, sealants, gaskets, etc.) shall be of the same type and size, have undergone the same method of construction, and have the same details, flashing and anchorage as the building facade.	
(ii) for a cavity wall— **(A)** a transparent material for a proportion of the internal wall lining (to provide an unobstructed view of the external wallcladding) with sufficient structural capability and similar air tightness to resist the applied wind pressures; and **(B)** a 15 mm diameter hole in the internal wall lining below a window.	No specific requirements are given.	As AS/NZS is written with curtain walls specifically in mind there is no specific mention for this additional test.
(c) Test procedure **(i)** The test procedure for a direct fix cladding wall or unique wall must be as follows: **(A)** Apply 100% positive and negative serviceability wind pressures to the external face of the test specimen for a period of not less than 1 minute each.	**8.2.2** The test sample shall be subjected to the positive and negative SLS design wind pressures. These pressures shall be maintained for 10 s at the positive requirement followed by 10 s at the negative requirement. **8.3.3 (a)** An initial pressure differential equivalent to either the positive or the negative structural-test pressure shall be applied against the external face of the test sample for a period of 2 min which shall be taken as a settling/take-up period.	AS/NZS 4284 requires a shorter pre-load duration prior to the preliminary tests (**8.2.2**), this is because the full SLS pressures are applied to the sample in **Clause 8.3.**
(B) Apply static pressure of either 300 Pa or 30% serviceability wind pressure, whichever is higher, in accordance with the water penetration test procedure at clause 8.5.2 of AS/NZS 4284.	**8.5.1 Test pressure** The water penetration test pressure shall be nominated by the Specifier, or taken as the greater of 300 Pa or 0.3 Ws	**NCC 2019 BCA FV1.1(c)(i)(B)** references **AS/NZS4284 8.5.2** as the test method to apply. Both clauses are functionally identical.
(C) Apply cyclic pressure in accordance with—	The water penetration test using cyclic pressure shall be carried out	**NCC 2019 BCA FV1.1(c)(i)(C)** references **AS/NZS4284 8.6.2**

NCC 2019 BCA Volume 1 FV1.1	AS/NZS 4284	Significant Differences
(aa) the three stages of Table FV1.2; and **(bb)** the water penetration test procedure at clause 8.6.2 of AS/NZS 4284.	in three stages and shall take into account the geographical location and exposure of the building and shall be specified by the Specifier, or taken as the following: (a) Stage 1- 0.15×W_s to 0.3×W_s (b) Stage 2- 0.2×W_s to 0.4×W_s (c) Stage 3- 0.3×W_s to 0.6×W_s where Ws = positive serviceability test pressure. (Should Ws pressure be less than 1000 Pa, use 1000 Pa instead of Ws in this Clause.)	as the test method to apply. The difference in these clauses is that NCC references a load table with no minimum pressure requirements. These clauses are functionally identical except the **NCC 2019 BCA FV1.1(c)(i)(C)** has no minimum pressure requirement.
FV1.1(c)(ii)		This clause applies to drained cavity walls which are not the subject of this report.
FV1.1(d)(i) A direct fix cladding wall and unique wall are verified for compliance with FP1.4 if there is no presence of water on the inside surface of the facade.	**9.4 Water penetration test** Under static and cyclic pressures there shall be no leaks. For both the static and cyclic water tests, a leak is considered to occur when one or more of the following occur: (a) Water appears on any inside surface of the facade and is visible from an occupied space. (b) Uncontrolled water appears on any inside surface of the facade. (c) Water appears that is likely to wet insulation, fixtures and finishes. (d) Water appears in other locations specified as unacceptable by the Specifier.	The acceptance criteria are functionally similar for these clauses.
FV1.1(d)(ii)		This clause applies to drained cavity walls which are not the subject of this report.
FV1.1(e) Test Report	**10.2**	Reporting requirements are functionally similar with AS/NZS requiring additional information.

The ALFREX cladding system test report, *FLL 18-20 Alfrex NZS4284 Final,* indicates compliance to AS/NZS 4284. The test sample was constructed as per the requirements of the New Zealand building code clause E2/VM1 and included the following features:

- Top booth liner
- Bottom booth liner
- Horizontal joint
- Vertical joint
- Soffit corner
- Soffit/wall junction
- Inter-story junction
- Window head junction
- Window sill junction
- Penetration
- Internal corner
- External corner
- Parapet

The test results presented in the FacadeLab report (#18-20) indicate that the Alfrex system, when installed with any combination of the above features, has passed the criteria required to satisfy verification method FV1.1 and V2.2.1 of NCC 2019 Volume 1 and Volume 2.

As per the NCC 2019 this shows compliance with FP1.4 and P2.2.2 provided that the following project specific criteria hold:

- The external wall has a risk score of 20 or less
- Is subjected to a ULS wind pressure of less than 2.5kPa
- Only includes AS2047 compliant windows

Kind Regards,

Robert Dyck

Project Engineer

Vipac Engineers & Scientists Ltd

Document Approved by Tim Roffey 09/07/2019